Computer Aided Design Technology

Program of Studies

2014-2015

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Kentucky Department of Education

Computer Aided Design Technology

Course Title	Post-Secondary Connection	Valid Course Code	Recommended Grade Level							Recommended Credit
			6	7	8	9	10	11	12	
Architectural Design	CAD 220	480116						x	x	1
Advanced Dimensioning and Measurement	CAD 240	470924				x	x	x	x	1
Construction Drafting (Techniques)	CAD 230	480119						x	x	1
*Cooperative Education I	CAD 199	480142						x	x	1
*Cooperative Education II	CAD 299	480143						x	x	2
*Cooperative Education III	CAD 199 & 299	480144						x	x	3
Drafting Fundamentals	CAD 102	480111				x	x	x	x	1
Engineering Graphics	CAD 112	480113						x	x	1
Industrial Drafting Processes	CAD 212	480127						x	x	1
Intermediate Computer Aided Drafting	CAD 200	480112				x	x	x	x	1
*Internship I	CAD 198	480145						x	x	1-3
Introduction to Architecture	CAD 120	480115						x	x	1
Introduction to Computer Aided Drafting	CAD 100	480110				x	x	x	x	1
Introduction to Surveying	CAD 108	480104				x	X	x	x	1
Mechanical Design	CAD 222	480135						x	x	1
Parametric Modeling	CAD 201	480136						x	x	1
*Special Problems (CADD)	CAD 293	480179						x	x	1

Computer Aided Design Technology Education

Overview of Computer Aided Design Technology Education

Purpose:
The vision of Computer Aided Design Technology Education is to promote safety standards, performance standards, enhance leadership, provide relevant curriculum, and to be vital to the education of all students.
Computer Aided Design Technology Education will:

- Operate as the venue for nationally recognized industry standard training.
- Provide a critical link in school to employment or postsecondary education.
- Develop stronger relationships with the community in terms of mutual advocacy, cooperative field experiences, employment placement, and support for relevant student organizations and competitions
- Represent an important component in the education of all students.
- Require and promote critical thinking and problem solving.
- Offer an up to date curriculum based on standards that adapts to changes in the industry.
- Integrate academic skills into the Computer Aided Design Technology Curriculum in order to insure that students develop written & verbal communications skills, computational skills, and scientific/math problem-solving skills.

Career Pathways:

- ***Design Technician***
- ***Mechanical Designer***
- ***Architectural Designer***

Standard Based Curriculum
The CAD curriculum is composed of standards based competencies. All CAD programs incorporate industry and common core standards thus increasing the student's qualifications toward successful employment.
Alignment of the CAD curriculum with nationally recognized industry standards and the common core standards provides optimal preparation for students to acquire an industry certification.
Communities understand that this preparation provides better career opportunities for students and the demands of today's workforce for the 21st century.

Kentucky Occupational Skill Standards
The Kentucky Occupational Skill Standards are the performance specifications that identify the knowledge, skills, and abilities an individual needs to succeed in the workplace. Identifying the necessary skills is critical to preparing students for entry into employment or postsecondary education. These standards described the necessary **occupational, academic,** and **employability** skills needed to enter the workforce or post- secondary education in specific career areas. There is an ongoing effort to continue to refine these standards by which exemplary Career and Technical Education Programs ms are evaluated and certified. This helps insure that curriculum meets industry specifications.

Work Based Learning
Cooperative experience, internships, shadowing and mentoring opportunities provide depth and breadth of learning in the instructional program and allow students to apply the concepts learned in the classroom. The Work Base Learning Guide is available on the KDE webpage: www.education.ky.gov.

Student Organizations and Competitions
Participation in Skills USA Competition provides a vehicle for students to employ higher order thinking skills, to interact with high-level industry people and to further enhance their leadership skill through their participation in regional, state and national competitive events and local activities.

KDE/OCTE Career Pathways Computer Aided Design 2014-2015		
Career Pathway	**Core Courses**	**Elective Courses**
Design Technician **CIP Code-15.1301.01** *Tests for Certification* * Certiport AutoCAD Certified User TRACK Pre-Apprenticeship * KOSSA-Manufacturing Test	• **CAD 100- Introduction to Computer Aided Drafting-480110** • **CAD 102-Drafting Fundamentals-480111** • **CAD 112-Engineering Graphics-480113** • **CAD 212-Industrial Drafting Process-480127**	• **CAD 201 Parametric Modeling-480136** • **CAD 200 Intermediate Computer Aided Drafting-480112** • **CAD-198-Internship I -480145** • **CAD 222-Mechanical Design-480135** • **CAD 199-Cooperative Education I -480142** • **CAD 299-Cooperative Education II -480143** • **CAD 199+299-Cooperative Education III-480144** • **CAD-293-Special Problems (CADD) - 480179** • **PLTW IED-Introduction to Engineering Design-219901**
Mechanical Designer **CIP Code-15.1301.02** *Tests for Certification* * Certiport AutoCAD Certified User * Certiport Autodesk Inventor Certified User *Solid Works Certified Associate TRACK Pre-Apprenticeship * KOSSA-Manufacturing Test	• **CAD 100- Introduction to Computer Aided Drafting-480110** • **CAD 102-Drafting Fundamentals-480111** • **CAD 201-Parametric Modeling-480136** • **CAD 222- Mechanical Design**	• **CAD 112 - Engineering Graphics** • **CAD-198-Internship I -480145** • **CAD 200- Intermediate Computer Aided Drafting** • **CAD 212-Industrial Drafting Processes-480127** • **CAD 240-Advanced Dimensioning and Measurement – 470924** • **CAD 199-Cooperative Education I -480142** • **CAD 299-Cooperative Education II -480143** • **CAD 199+299-Cooperative Education III-480144** • **CAD-293-Special Problems (CADD) - 480179** • **PLTW IED-Introduction to Engineering Design-219901**

Architectural Designer **CIP Code-15.1301.03** *Tests for Certification* * Certiport AutoCAD Certified User * Certiport Autodesk Revit Certified User TRACK Pre-Apprenticeship * KOSSA-Manufacturing Test	• **CAD 100- Introduction to Computer Aided Drafting-480110** **CAD 102-Drafting Fundamentals-480111** • **CAD 120- Introduction to Architecture-480115** • **CAD 220-Architectural Design-480116**	• **CAD 230-Construction Techniques-480119** • **CAD-198-Internship I - 480145** • **CAD 199-Cooperative Education I -480142** • **CAD 299-Cooperative Education II -480143** • **CAD 199+299-Cooperative Education III-480144** • **CAD-293-Special Problems (CADD) - 480179** • **CAD-108-Introduction to Surveying - 480104** • **PLTW IED-Introduction to Engineering Design-219901**
CAD Manufacturing TRACK ***CIP Code-15.1301.99*** *Tests for Certification* ***** *Certiport AutoCAD Certified User* ** Certiport Autodesk Revit Certified User* *TRACK Pre-Apprenticeship* ** KOSSA-Manufacturing Test*	• **(4)- Core courses** • **Chosen from CAD valid course list.** • **By Company sponsoring State Registered Apprenticeship.**	• **(4)- Core courses** • **Chosen from CAD valid course list.** • **By Company sponsoring State Registered Apprenticeship.**

KENTUCKY CAREER PATHWAY/PROGRAM OF STUDY

COLLEGE/UNIVERSITY: Kentucky Technical College or University
CLUSTER: Manufacturing Technology
PATHWAY: Computer Aided Design
HIGH SCHOOL (S): KY County High School
PROGRAM: Computer Aided Design Technology

	GRADE	ENGLISH	MATH	SCIENCE	SOCIAL STUDIES	REQUIRED COURSES RECOMMENDED ELECTIVE COURSES OTHER ELECTIVE COURSES CAREER AND TECHNICAL EDUCATION COURSES			CREDENTIAL CERTIFICATE DIPLOMA DEGREE	Occupations
SECONDARY	9	English 1	Algebra I - Part 1	Earth Space Science	ROTC I or World Geography	Health and PE	CIS 100 Intro to Computers	CAD 102 Drafting Fundamentals-		
	10	English II	Algebra I - Part II	Biology I	World Civics	History and Appreciation of Fine Arts	CAD 100 Intro to CAD	CAD 201 Parametric Modeling	(AuotoDesk Certified User) (Inventor	(Design Technician) (Mechanical
	11	English III	Algebra II	Physics or Chemistry	US History	Elective	CAD120 Intro to Architecture	CAD 112 Engineering Graphics	AutoDesk Revit Certified User / Architectural	Architectural Designer
	12	English IV	Pre-Calculus	Elective	Elective	Elective	CAD212 Industrial Drafting Processes	DFT 293 Special Problems	HS Diploma/TRACK Pre-	
POSTSECONDARY	Year 13	ENG 101 Writing I	Humanities	Math	Social Science 3 hr's	Science	Oral Communications	DFT 130 Descriptive Geometry	Ashland Community & Technical College	Computer Aided Drafter,
	Year 14	Electives 6 hr's	DFT 292 Industrial Applications	ADFT 252 Commercial Detailing	ADFT 262 Working Drawings	DFT 212 Industrial Drafting	DFT 222 Mechanical Design	DFT 240 Advanced Dimensioning	**AAS Degree**	
	Year 15	Math 6 hr's	Physical Science 4 hr's	Computer Science 3 hr's	Social Science 3 hr's	Practical Living 3 hr's	Electives 3 hr's	Electives 3 hr's	Morehead State University	
	Year 15 & 16	IET 303 3hrs Materials Science	IET 310 3 hrs Engineering Economics	IET 317 3 hrs Lean Systems	IET 319 3 hrs Quality Control	IET 320 3 hrs Project Management	IET 327 3 hrs Applied Industrial Management	IET 330 3 hrs Industrial Design		
	Year 16	IET 371 1 hr Seminar	IET 419 3 hrs Total Quality Management	IET 422 3 hrs Industrial Safety	IET 430 3 hrs Facilities Management	IET 519 3 hrs Design of Experiments	Senior Project 3 hr's	Electives 3 hr's	**BS Degree in Engineering Technology**	Computer Engineer, Architect

Required Courses

Computer Aided Design Technology Courses/Tasks

CAD 220
Architectural Design
480116

Course Description:
Combines the elements and fundamentals of architectural design with the theory and application of presentation techniques. Deals with site selection, use of materials in design, spatial relationships, and aesthetics. Traditional and contemporary design, designers, processes, and historical milestones are explored. Board and computer techniques are used in illustrating interiors of student designs.

Prerequisites: Introduction to Architecture-480115

Content/ Process

Students Will:

1 Demonstrate and practice safe work habits in the lab area.
2 Identify symbols and materials used with the floor plan.
3 Draw a residential floor plan.
4 Use appropriate dimensioning techniques for architectural drawing standards.
5 Use drafting references and vendor product catalogs.
6 Draw residential elevation drawing.
7 Draw and dimension presentation elevations.
8 Construct accompanying drawings to the floor plan, including foundation, framing, electrical, plumbing, heating, ventilation and air conditioning.
9 Identify material representations in plan and section views.

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 240
Advanced Dimensioning and Measurement
470924

Course Description:
Presents an in-depth study of advanced industrial dimensioning principles, tolerances, fits, and A.N.S.I. standards. Exploration of the shape and geometric characteristics of parts through geometric tolerance.

Prerequisites: Engineering Graphics-480113

Content /Process

Students Will:

1. Demonstrate and practice safe work habits in the lab area.
2. Define terms and principles used in advanced dimensioning.
3. Apply using drawing practices, tolerance dimensioning on mating parts.
4. Explain and work with A.N.S.I. standards.
5. Demonstrate surface texture symbols and surface finish.
6. Compare conventional tolerancing with Geometric Dimensioning and Tolerancing.
7. Establish a basic understanding of Geometric Dimensioning and Tolerancing.
8. Analyze specific graphic designs and determine the proper location for dimensions.
9. Define terms and principles relating to Dimensional Metrology.
10. Demonstrate a working knowledge of basic hand held measuring instruments.
11. Measure with basic hand held measuring instruments.
12. Explain the relationship of precision measurement to manufacturing and design.
13. Demonstrate a working understanding of one-tenth of an inch or one-thousandth of an inch.

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

Construction Drafting (Techniques)
480119

Course Description:
This lecture and lab course covers the elements for constructing standard residential and commercial buildings. Wood frame, solid masonry veneer, concrete, and steel construction details are explored. Students will learn essentials of standard construction details, which illustrate the various construction methods and will develop a portfolio for those techniques.

Prerequisites: Introduction to Computer Aided Drafting-480110
Drafting Fundamentals-480111

Content /Process

Students Will:

1 Demonstrate and practice safe work habits in the lab area.
2 Construct residential foundation plans
3 Construct residential floor framing plans
4 Construct residential wall framing plans
5 Construct residential roof framing plans
6 Construct detailed drawings of reinforced concrete
7 Construct detailed drawings of typical wood frame sections
8 Construct detailed drawings of concrete blocks and masonry units
9 Draw stair plans and details
10 Draw fireplace plans and sections
11 Construct Cross Section for residential plan
12 Construct section drawings of roofs with parapets

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 199
Cooperative Education I
480142

Course Description: Cooperative Education provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Cooperative Education program receive compensation for their work.

Prerequisite: Permission of Instructor

Content /Process

Students Will:

1. Demonstrate and practice safe work habits in the lab area.
2. Gain career awareness and the opportunity to test career choice(s)
3. Receive work experience related to career interests prior to graduation
4. Integrate classroom studies with work experience
5. Receive exposure to facilities and equipment unavailable in a classroom setting
6. Increase employability potential after graduation
7. Earn funds to help finance education expenses

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 299

Cooperative Education II
480143

Course Description:
Cooperative Education provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Cooperative Education program receive compensation for their work.

Prerequisites: Consent of the Instructor

Content Process

Students Will:

1. Demonstrate and practice safe work habits in the lab area.
2. Gain career awareness and the opportunity to test career choice(s)
3. Receive work experience related to career interests prior to graduation
4. Integrate classroom studies with work experience
5. Receive exposure to facilities and equipment unavailable in a classroom setting
6. Increase employability potential after graduation
7. Earn funds to help finance education expenses
8. Demonstrate and practice safe work habits in the lab area.

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 199+299
Cooperative Education III
480144

Course Description:
Cooperative Education provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Cooperative Education program receive compensation for their work.

Prerequisites: Consent of the Instructor

Content Process

Students Will:

1. Demonstrate and practice safe work habits in the lab area.
2. Gain career awareness and the opportunity to test career choice(s)
3. Receive work experience related to career interests prior to graduation
4. Integrate classroom studies with work experience
5. Receive exposure to facilities and equipment unavailable in a classroom setting
6. Increase employability potential after graduation
7. Earn funds to help finance education expenses
8. Demonstrate and practice safe work habits in the lab area.

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 102
Drafting Fundamentals
480111

Course Description:
Explores drafting and its processes: use and maintain equipment and supplies; determine line weights; measure and read line lengths with drafting scales; measure angles; and draw lines, circles, arcs, and irregular curves. Freehand and mechanical lettering, geometric construction, freehand sketching, and beginning orthographic projection. Characteristics of lines and planes in orthographic projection and the principles applied to show the size and shapes of projects. Dimensioning techniques for orthographic drawings.

Prerequisites: None

Content Process

Students will:

1. Demonstrate and practice safe work habits in the lab area.
2. Use and maintain basic drafting equipment and machines
3. Use architect's, metric, civil, and mechanical engineer's scales
4. Identify and draw the alphabet of lines
5. Demonstrate correct lettering techniques
6. Construct one-view drawing
7. Reproduce drawings
8. Utilize proper drawing setup procedures
9. Demonstrate geometric construction techniques
10. Draw orthographic views and transfer features
11. Freehand sketch orthographic and pictorial views
12. Construct Multiview drawings from pictorial sketches
13. Apply basic dimensioning techniques
14. Solve mathematical problems related to drafting
15. Understand title blocks
16. Reproduce prints

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO’s-Skills USA

CAD 112
Engineering Graphics
480113

Course Description:
Includes exploration of lines and planes as they relate to orthographic projection to show the size and shape of objects. Includes application of principles and graphic elements of sectioning to show interior detail; the techniques involved in creating oblique projections, axonometric projections, and perspective drawings; and the dimensioning techniques and symbol usage common to all drafting disciplines.

Prerequisites: Drafting Fundamentals-480111

Content Process

Students Will:

1. Demonstrate and practice safe work habits in the lab area.
2. Construct advanced orthographic drawings from pictorial views.
3. Construct drawings of basic sectional views.
4. Apply dimensioning techniques.
5. Construct title blocks, revision blocks, materials list, and tolerancing blocks.
6. Freehand sketch orthographic and pictorial views.
7. Construct axonometric drawings.
8. Construct oblique drawings.
9. Construct one-point perspective.
10. Construct two-point perspective.

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 212
Industrial Drafting Processes
480127

Course Description:
Explores weldment design, welding symbols, welding processes, and fabrication techniques, tool and die, and jig and fixture drawings. Design specifications, pattern drawings, casting, forming processes, and mechanical drawing principles in relation to the manufacturing industry. Screw-thread design and related fastening concepts as they relate to manufactured items and construction.

Prerequisite: Introduction to Computer Aided Drafting-480110

Content/ Process

Students Will:

1. Demonstrate and practice safe work habits in the lab area.
2. Identify and use welding symbols on fabrication drawings
3. Construct welding assembly drawings
4. Construct casting drawings
5. Construct forging drawings
6. Construct jig and fixture drawings
7. Construct tool and die drawings
8. Identify, specify, and construct drawings of fasteners
9. Construct and dimension keyway and keyseat drawings
10. Construct detailed, schematic and simplified thread drawings
11. Construct spring drawings

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 200
Intermediate Computer Aided Drafting
480112

Course Description:
Uses CAD software to produce advanced two-and three-dimensional object drawings. Advanced techniques of drafting, layering, and symbols associated with one or more design applications. Calculations of perimeters, areas, and mass associated with the drawings. (PROJECT LEAD THE WAY COMPONENT).

Prerequisite: Introduction to Computer Aided Drafting-480110

Content Process

Students Will:

1. Demonstrate and practice safe work habits in the lab area.
2. Demonstrate, through practice and communications, a comprehensive working knowledge of CAD drafting and the drafting symbols associated with one or more design applications.
3. Produce complex drawings through use of CAD techniques.
4. Use CAD to calculate perimeters and areas for design features.
5. Construct three-dimensional models using various techniques.
6. Project two-dimensional orthographic and axonometric views and sections off of the three-dimensional models.
7. Use advanced CAD operations.
8. Demonstrate and practice safe work habits in the lab area.

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 198
Internship I
480145

Course Description:
Internship provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Practicum do not receive compensation.

Prerequisites: Permission of Instructor

Content Process

Students Will:

1. Demonstrate and practice safe work habits in the lab area.
2. Gain career awareness and the opportunity to test career choice(s)
3. Receive work experience related to career interests prior to graduation
4. Integrate classroom studies with work experience
5. Receive exposure to facilities and equipment unavailable in a classroom setting
6. Increase employability potential after graduation
7. Demonstrate and practice safe work habits in the lab area.
8. Gain career awareness and the opportunity to test career choice(s)

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 120
Intro to Architecture
480115

Course Description:
Provides a practical approach to architectural drafting. An introduction to board and computer aided drafting as it relates to residential and commercial architecture, specifications, and structural systems including wood, masonry, concrete, and steel.

Prerequisite: Introduction to Computer Aided Drafting-480110

Content Process

Students Will:

1. Demonstrate and practice safe work habits in the lab area.
2. Use proper drawing setup for architectural scales
3. Relate the design with site considerations.
4. Sketch a residential floor plan.
5. Identify floor plan symbols.
6. Identify material representations in plan and section views.
7. Apply basic dimensioning techniques.
8. Construct accompanying drawings to the floor plan - i.e. elevations and electrical plans.

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 100
Intro to Computer Aided Drafting
480110

Course Description:
Uses computer graphic workstation in the application of fundamental principles and capabilities of CAD, basic drafting conventions, and operations. An in-depth study of computer aided drafting commands, terminology, command utilization, and skill development.

Prerequisite: None

Content Process

Students Will:

1. Demonstrate and practice safe work habits in the lab area.
2. Describe, using correct computer terminology, basic computer functions, uses of computers in society and different types of software.
3. Discuss ethical computing issues, such as copyright, privacy, security, and property.
4. Use graphical user interface.
5. Use computer application programs.
6. Access information sources found on networks such as the Internet and be familiar with Web browsers, search sources, and sources of information related to his or her own field.
7. Demonstrate an awareness of different types of software applications.
8. Produce line entities using various coordinate techniques.
9. Construct geometric shapes in two-dimensional space.
10. Develop detailed orthographic views as required.
11. Construct cross sections of various designs, with cross-hatching incorporated as desired.
12. Apply dimensions and annotations to drawings.
13. Move, copy, delete, and save drawings or portions of drawings.
14. Use CAD to manipulate drawings by means of translation, rotation, scaling, zooming, panning, and windowing.
15. Explore 3-D drawing techniques.

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 108
Intro to Surveying
480104

Course Description:
Introduces the elements of surveying including measurements, distance corrections, leveling, angles, area computation, computer calculations, topographic surveying, and electronic distance measuring instruments, construction surveying, GPS, and GIS.

Prerequisite: None

Content Process

Students Will:

1. Demonstrate and practice safe work habits in the lab area.
2. Identify surveying methods and notations of measurements.
3. Analyze correction of error.
4. Identify surveying instruments.
5. Identify various methods of leveling.
6. Explain methods of traverse calculations and area computation.
7. Analyze computer calculations and omitted measurements.
8. Identify various types of surveys.
9. Explain Global Positioning System and Geographic Information Systems.
10. Identify volumes and horizontal and vertical curves.
11. Demonstrate and practice safe work habits in the lab area.
12. Identify surveying methods and notations of measurements.
13. Analyze correction of error.
14. Identify surveying instruments.

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 222
Mechanical Design
480135

Course Description:
Explores the design process involved in the development of mechanical working drawings and the design principles in various manufacturing disciplines; gear drawing and design, and cam and follower drawing and design. Design principles, mechanical adaptation, and their drawing practices. Mechanical assemblies, machine design, power transmission, bearings, and seals in assemblies. Shop processes involved in these mechanical designs.

Prerequisite: Introduction to Computer Aided Drafting-480110

Content /Process

Students Will:

1 Demonstrate and practice safe work habits in the lab area.
2 Construct mechanical working drawings
3 Construct gear drawing
4 Construct can and follower drawings
5 Solve mechanical problems related to gears and cams.
6 Select appropriate gears from vendor catalogs.
7 Construct mechanical power transmission drawings
8 Construct assembly drawings using bearings and seals
9 Demonstrate knowledge of shop processes

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA

CAD 201
Parametric Modeling
480136

Course Description:
Introduces Parametric Modeling and Design of a CAD workstation in exploring the techniques associated with drafting and design using Parametric modeling software. Introduces creation of parametric models and explores associative function and flexibility of concurrent part design.

CAD 100 or CAD 200
Prerequisite: Introduction to Computer Aided Drafting-480110 or
Intermediate Computer Aided Drafting-480112

Content/Process

Students will:

1. Demonstrate and practice safe work habits in the lab area.
2. Demonstrate an awareness of the terminology and concepts of Parametric Modeling
3. Demonstrate basic parametric modeling procedures
4. Demonstrate the ability to create parametric sketches
5. Create fully constrained sketches
6. Apply/modify geometric constraints and dimensions to capture and alter the design geometry of the part
7. Demonstrate through practice, the construction of simple parametric solid models
8. Demonstrate the ability to perform feature-based modeling operations on parts
9. Perform analyses on the model
10. Perform simple assembly modeling
11. Create desired working drawing layouts and dimensioned views from parametric solids

Connections:

- Common Core Standards
- KOSSA
- Common Core Technical Standards
- New Generation Science Standards
- AutoDesk Industry Standards
- SolidWorks Industry Standards
- Post-Secondary Education
- CTSO's-Skills USA

CAD 293
Special Problems (CAD)
480179

Course Description:
Allows the student to gain intermediate experience in their perspective fields through projects and tasks assigned by the instructor and based on applications the student may one day experience as a professional. Sets the foundation for more in-depth projects that will be included in the student's future portfolio. Focuses on various assignments and curriculum as determined by the program instructor.

Permission of Instructor

Content /Process

Students Will:

1 Demonstrate and practice safe work habits in the lab area.
2 Expand their portfolio of CAD drawings to enhance career opportunities
3 Discuss occupation opportunities

Connections:

*Common Core Standards
*KOSSA
*Common Core Technical Standards
*New Generation Science Standards
*AutoDesk Industry Standards
*SolidWorks Industry Standards
*Post-Secondary Education
*CTSO's-Skills USA